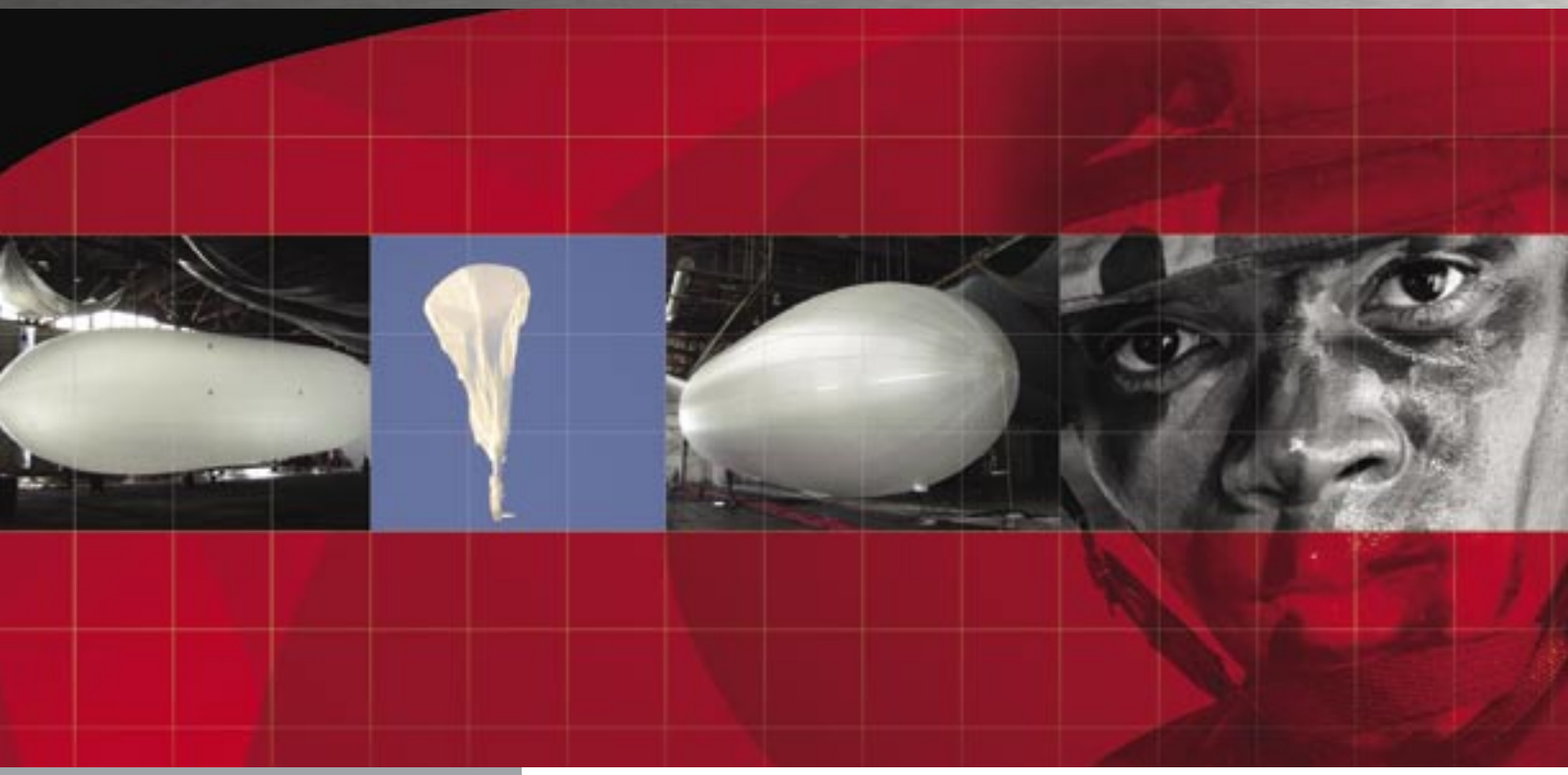
SMDC/ARSTAT

Technical Center

HALL

High Altitude Long Loiter Efforts



Summary

- Demonstrates military utility of LTA and HTA HALL platforms with payloads
- Utilizes payloads in areas of surveillance, communications, and Reconnaissance, Surveillance, Target Acquisition (RSTA)
- SMDC/ARSTRAT launched an LTA airship to 70,000 ft. in recent tests
- Spiral development of the HiSentinel airships with 50-200 lb. payload and 200-1000 W power (initial 2006 flight)
- MDA HAA program with initial capability of 500 lbs / 3 kW scheduled to fly in 2010
- DARPA ISIS program seeking advancement in material development to advance overall airship capability

Developing High Altitude Long Loiter platforms and testbed framework to provide persistent surveillance and/or communications relays.

The objective is to provide HALL platforms and testbed framework for persistent surveillance and communications relays. HALL platforms include Lighter-Than-Air (LTA) and Heavier-Than-Air (HTA). LTA platforms will demonstrate the military utility of a large, unmanned, helium-filled airship. The U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) has three LTA efforts. The first effort is the SMDC/ARSTRAT HiSentinel program which will be launched in theater without any logistic burden. SMDC/ARSTRAT supports the Missile Defense Agency (MDA) High Altitude Airship (HAA) program in which the platform carries a payload for 30 days. The third effort is the Defense Advanced Research Projects Agency (DARPA) Integrated Sensor Is the Structure (ISIS) program. The ISIS program is integrating a powerful radar into the structure of the airship. SMDC/ARSTRAT has one HTA effort, the Orion, which is a lightweight Unmanned Aerial Vehicle. SMDC/ARSTRAT has one testbed framework effort which provides a testbed framework to produce a hardware-in-the-loop capability for HALL payloads.

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Overview

The objective is to demonstrate engineering feasibility and potential military utility of LTA and HTA HALL platforms. LTA platforms will be unmanned, helium-filled airships that can fly un-tethered at altitudes of greater than 60,000 feet above the ground and carry a heavy multi-mission payload, providing 325-mile line-of-sight to the horizon. There are two objective LTA platforms. The first LTA platforms, MDA HAA and DARPA ISIS, will self-deploy from CONUS to the theater of operation and remain on-station for up to a year with the ability to station keep. The initial HAA will be capable of carrying a 500lb/3kW payload weight and power for 30 days. The legacy HAA will be capable of 4,000lb/15kW payload weight and power at 70kft for up to a year. The second objective LTA platform is the HiSentinel, which will be launched in theater. The initial HiSentinel that is being pursued will be capable of 50lb/200W payload at 67kft for two days, and the objective HiSentinel is capable of 200lb/1000 W payload at 67kft for 30 days. The HTA platform will be launched in the continental U.S. or in theater and remain on station for four days while providing 440lb/8kW payload weight and power. These activities support: CINC IPLs (USFK, PACOM, SPACECOM, SOCOM, CENTCOM); FOCs (SP 98-001, SP 98-002, SP 98-004); SORC ISR/TA: 32 – extend vision beyond line of sight; SORC Survivability: 6 – improved early warning of ground and air launched weapons; SORC Survivability: 7 – improved early warning for TAMD; and SORC Sustainability: 3 – sustainment effectiveness and efficiencies.

Benefits for Tomorrow's Defense

HALL platforms will provide a much needed persistent 24/7 capability for surveillance and communication platforms to see over-the-horizon for theater and homeland defense operations. Presently, high altitude platforms are limited to short duration missions of about 24 hours then they must come down and prepare for their next mission. The LTA platforms will provide an unmanned airship capable of carrying different payloads for a duration greater than 30 days. It may station keep within a two km radius at greater than 60,000 ft altitude providing a 325 mile line-of-sight capability to the horizon. With the capability of station keeping and long duration, this can provide persistent communications and Wide Area Surveillance (WAS). The HTA platforms can provide persistent communication and WAS provides shorter duration (4 days) but a quicker deployment than LTA platforms. Both LTA and HTA will benefit the warfighters by providing a quick and long endurance platforms to meet the requirements for communications and WAS.

Technical Concept

The HALL platforms involve several technological capabilities and operate in a harsh environment where the system would be exposed to low temperatures, ultra-violet radiation, turbulent winds and electrically charged weather patterns. It is required for the HALL platforms to be integrated for long duration missions and require reliable performance in the following technical areas:

- Hull fabric/composites will require strength and UV protection
- LTA platforms thermal management / mitigation
- LTA platforms gas pressure management
- Launch and recovery
- Stability and control
- Efficient power source
- Overall system weight.

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